$\vec{F}(x,y,z) = \langle P, Q, R \rangle$

Curl $\vec{F} = \langle R_y - Q_z \;, P_z - R_x \;, Q_x - P_y \rangle$

$\nabla f \times \vec{F}$

$\langle \frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z} \rangle \times \langle P, Q, R \rangle$

$\langle \frac{\partial f}{\partial y}(R) - \frac{\partial f}{\partial z}(Q), \frac{\partial f}{\partial z}(P) - \frac{\partial f}{\partial x}(R), \frac{\partial f}{\partial x}(Q) - \frac{\partial f}{\partial y}(P) \rangle$

Divergence $\vec{F} = P_x + Q_y + R_z$

$\nabla f \cdot \vec{F}$

$\boxed{\text{Ex:}}$ $\vec{F} = \langle x + yz, y + xz, z + xy \rangle$

$= \langle x - x, y - y, z - z \rangle$

$\vec{F} = \langle 0, 0, 0 \rangle$

curl $\vec{F} = \langle 0,0,0 \rangle$

Curl and div have properties similar to derivatives

$f(x,y,z)$ is a scalar-valued f_n, $\vec{F}(x,y,z)$ is a vector field

$f\vec{F} = \langle fP, fQ, fR \rangle$

$(\text{div } f \cdot F) = \nabla \cdot (f\vec{F}) = \nabla f \cdot \vec{F} + f \nabla \cdot \vec{F}$